

2005 Critical Response GIS Exercise

Operation Blue Ribbon



**A learning exercise for Local Public Health GIS
users.**

Statement of Purpose:

- Practice and improve the GIS skills of GIS users at LPHAs
- Test and evaluate the emergency functions for staff in the Mobile Command Center and the DSR

Participants

- Butler County Health Department
- Cass County Health Department
- Columbia-Boone County Health Department
- Pettis County Health Department
- St. Joseph-Buchanan County Health Department
- Howell County Health Department
- University of Missouri Extension
- Kansas Department of Health and Environment

Agenda

- Day 1 GIS/GPS training
- Day 2 Field Exercise
- Day 3 Debrief/ Discussions

Day 1

Classroom Training



State Fair Community College

Training began with a review of the GHERM program.





A warm-up exercise had participants work through a Bioterrorism event.

Participants learned how to use the Streetmap geocoder extension in ArcView.



A list of local restaurants provided by the host county was geocoded.



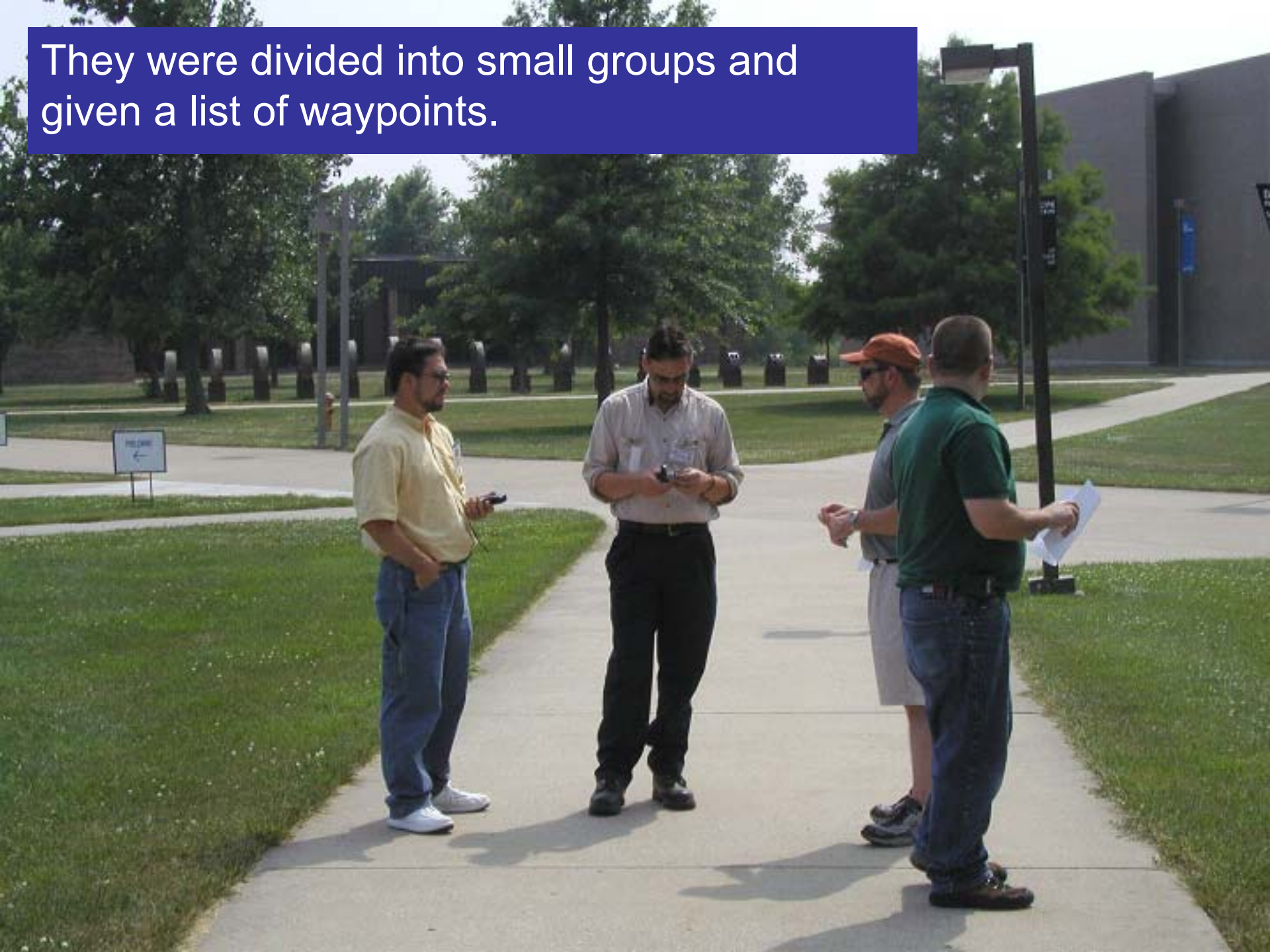
The afternoon session included a lecture on the basics of GPS.



Participants went outside to become familiar with the GPS units.



They were divided into small groups and given a list of waypoints.



The last waypoint location contained a prize for each group.



A spiral-bound notebook with a light beige, textured cover. The spiral binding is on the left side. The text "Day 2" and "Field Exercise" is centered on the cover.

Day 2

Field Exercise

The scenario:

Missouri State Fairgrounds:



"It is mid July and there is a large turnout for this year's state fair. Record number of people turned out for the opening weekend events. The fair kicked off with a parade Friday afternoon and a youth Livestock show. Events so far have included carnival rides, a tractor pull, demolition derby, goat and sheep exhibits. The fair will conclude next Saturday with the youth Sale of Champions. It has been sunny with temperatures in the mid 90's."

Day 5 of the Fair:

Investigators identified 26 people who experienced diarrhea. All attended the fair.




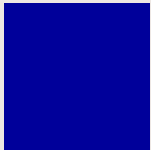
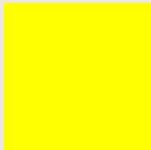

Laboratory tests confirmed the presence of **E coli 0157**. 8 were hospitalized and two had hemolytic uremic syndrome (HUS).

Emergency Operations Center

- Location: Room 714 Hopkins Center
- Exercise Director – Debbie Briedwell



Teams

- 4 teams:
 - Participants 
 - Observer 
 - Team advisor 
 - 
- Team follows directs given by advisor.
Reports to Exercise Director in
Emergency Operations Center

Investigation:

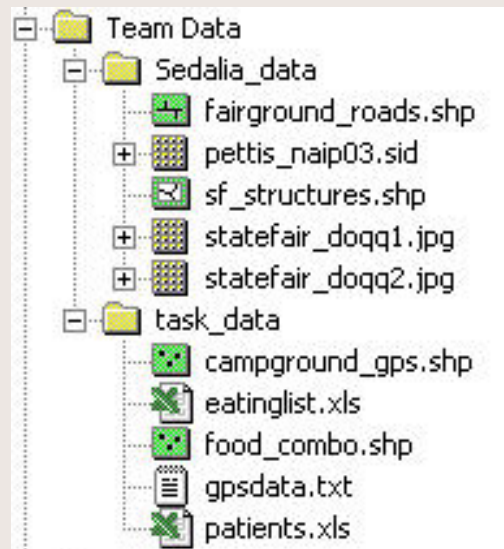
Investigators are currently in various locations at the fairgrounds.

Assignment: provide GIS support to the investigation.

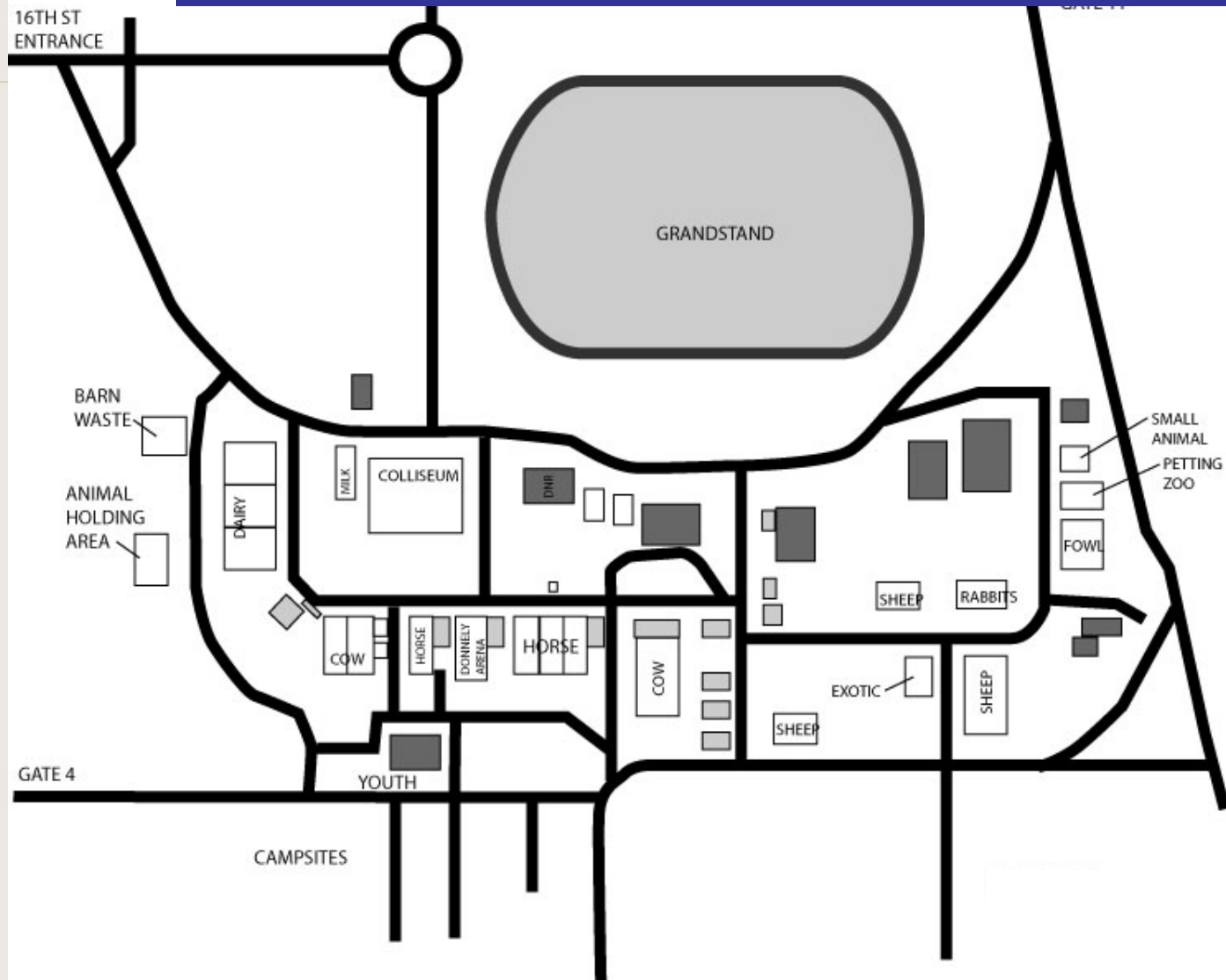
Tools:

CD's of data were provided to each team.

- Sedalia Data – simulated to be acquired by local sources
- Task Data – investigative data for each task



A map of the area was also provided to the teams.



THE TASKS



Waypoint Tour

Field investigators have been busy looking at different areas of the fairgrounds. Head down to the fairgrounds and look around. Your team evaluator has waypoints for the sites that the investigators are working in. Go to each site and see what is going on there. Take notes of anything you think is important.

Site	POINT X	POINT Y
1	-93.26043134610	38.69598903790
2	-93.25956276460	38.69542578820
3	-93.25899623880	38.69335471430
4	-93.25915729490	38.69150985170
5	-93.25809897840	38.69071735060
6	-93.25784995750	38.69292660640
7	-93.25770611730	38.69442104800
8	-93.25868748460	38.69532185200
9	-93.25883156200	38.69619851890

Locations across the fairgrounds were pre-selected and a list of waypoints was provided to the teams.



Each team used GPS units to find each waypoint.



Upon locating a waypoint, the team advisor gave the team a photo of the site and read a description about the site.



Livestock area: This is the livestock area for the fair. This is the site of the cow and horse barns. This is also the site of the Donnely Arena, where folks from all over the state can be found showing off their livestock.

Waypoint photo and description for the inner campground.



Campgrounds: This is the inner campground for the State fair. This area contains 347 sites with electric and water hookups. This area is restricted to fair exhibitors only. Investigators are currently interviewing campers to see if any have been feeling ill.

Waypoint photo and description for the eating areas.



Eating Areas: There are over 50 eating areas throughout the fairgrounds. Some sites contain permanent vendors, and others are portable. Investigators are currently looking into the food vendors and may ask for your assistance at a later time.

Waypoint photo and description for the petting zoo.



The Children's Barnyard: This is a popular place for the little ones at the fair. Due to the recent outbreaks of E coli at petting zoos, health officials were proactive and provided hand washing stations directly in the Children's Barnyard. Field investigators have already completed their investigation of this area and everything checked out ok.

Statewide affect of E coli outbreak:

The Department Situation Room for DHSS has requested a map showing the scope of this E coli outbreak. This information will be sent to the Governor, and is needed ASAP. Create a listing of affected LPHA offices to include with your map. Be sure to include the Highway Patrol districts on your map.

Create a map of Missouri that shows where the cases are located. Submit the map in pdf format to the EOC. Patient data with home addresses has been provided by DHSS in an excel form "patients.xls"

Create a list of LPHA offices that are affected and submit the list in pdf format to the EOC. Group the LPHAs by Highway Patrol district.

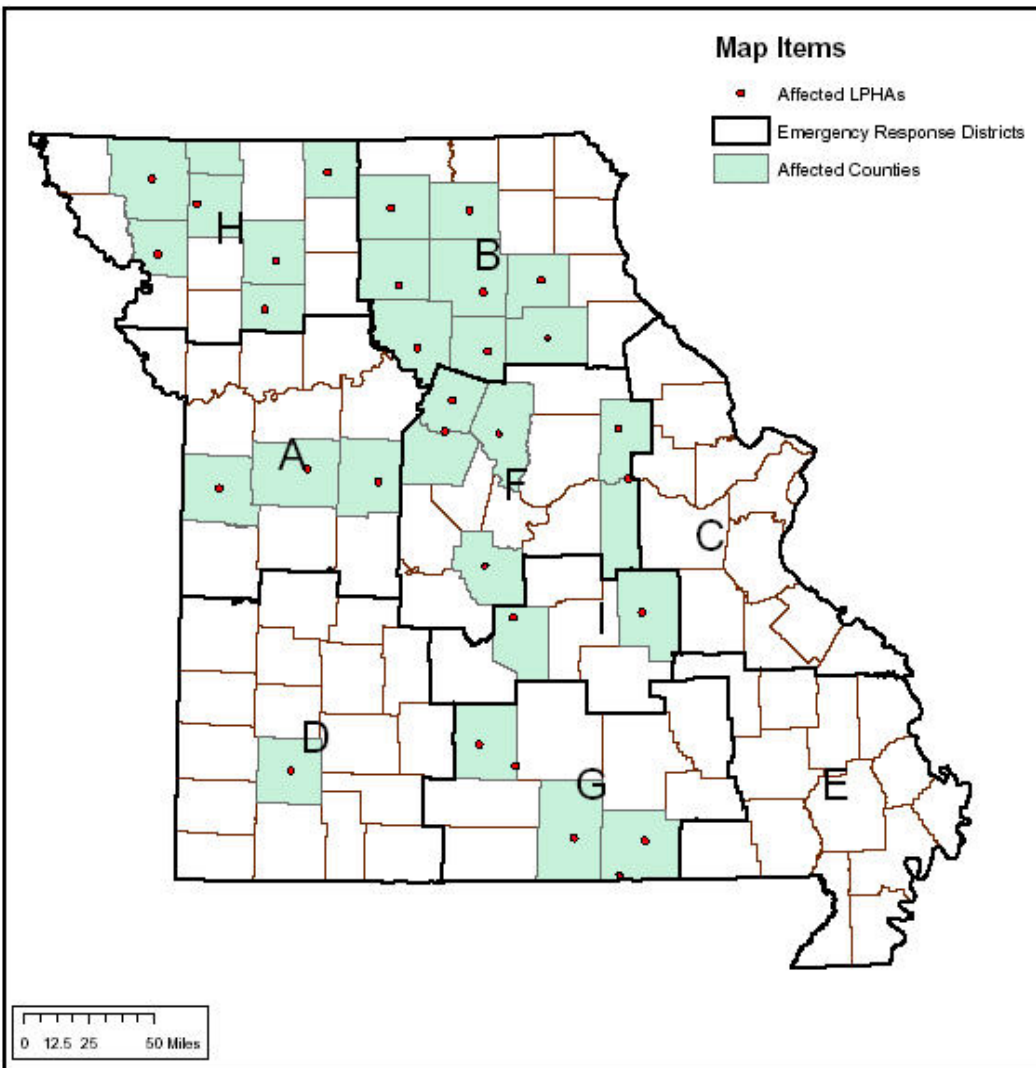
Teams had to clean and export data from an Excel spreadsheet.

6/29/2005 PATIENT INFORMATION							
PATIENT NUMBER	FIRST NAME	LAST NAME	AGE	HOME ADDRESS	CITY	ZIP CODE	COUNTY
1	Lyn	Beckman	18	21401 N Sydow Rd	Sturgeon	65284	Boone
2	Larry	Bennett	47	102 2nd St	Hughesville	65334	Pettis
3	Danny	Bennett	14	102 2nd St	Hughesville	65334	Pettis
4	Gentrie	Bennett	12	102 2nd St	Hughesville	65334	Pettis
5	Megan	Bertz	16	25852 County Rd 431	Shelbina	63468	Shelby
6	Joseph	Bitteral	15	14591 Hedge Dr	Green City	63545	Sullivan
7	Cody	Bitteral	42	14591 Hedge Dr	Green City	63545	Sullivan
8	Kable	Blackcap	14	221 County Road 117	Higbee	65257	Randolph
9	Dean	Bolton	15	21080 Elliot Rd	Hughesville	65334	Pettis
10	Cody	Byers	12	14228 County Road 3662	Savannah	64485	Andrew
11	Zach	Davis	18	289 Glensert Dr	Eldon	65026	Miller
12	Tim	Day	9	RR 2 Box 221	Pilot Grove	65276	Cooper
13	Mike	Derks	41	RR 1 Box 123	King City	64463	Gentry
14	Debby	Derks	31	RR 1 Box 123	King City	64463	Gentry
15	Dirk	Drechsel	22	22797 Rose Cottage Ln	Boonville	65233	Cooper
16	Jon	Drechsel	21	22797 Rose Cottage Ln	Boonville	65233	Cooper
17	Darrel	Edmondson	17	1977 Fritsch Ln	Owensville	65066	Gasconade
18	Rose	Gilbert	14	14111 198th St	Peculiar	64078	Cass
19	Sandra	Gilbert	32	14111 198th St	Peculiar	64078	Cass
20	Harold	Gilbert	32	14111 198th St	Peculiar	64078	Cass
21	Shawn	Gooden	20	13901 Berkley Ln	Crocker	65452	Pulaski
PATIENT NUMBER	FIRST NAME	LAST NAME	AGE	HOME ADDRESS	CITY	ZIP CODE	COUNTY
22	Austin	Harper	28	17851 Yale Ave	Kidder	64640	Daviess
23	Lindsay	Harper	3	17851 Yale Ave	Kidder	64640	Daviess
24	Lucas	Harper	2	17851 Yale Ave	Kidder	64640	Daviess



The data was summarized by county. The data was then joined to a county shapefile and symbolized.

Affected LPHAs



Key Map

****This map is for drilling purposes only.****



YlwTrn
Drill
affected_lpha
June 29, 2005 9:40AM

Adobe Acrobat - [TaskReport_blue.pdf]

File Edit Document Tools View Window Help

Affected LPHA Offices by SHP Region

AGENCY	ADDRESS	CITY	STATE	ZIP
A				
Cass County Health Department	300 S. Main	Harrisonville	MO	64701
Cass County Health Department	100 W. Wall	Harrisonville	MO	64101
Johnson County Community Health Services	429 Burkarth	Warrensburg	MO	64093
Pettis County Health Department	911 East 16th	Sedalia	MO	65301
B				
Adair County Health Department	1001 South Jamison	Kirkville	MO	63501
Linn County Health Department	635 South Main	Brookfield	MO	64628
Macon County Health Department	503 North Missouri	Macon	MO	63552
Monroe County Health Department	310 North Market	Paris	MO	65275
Randolph County Health Department	423 East Logan	Moberly	MO	65270
Shelby County Health Department	700 East Main	Shelbyville	MO	63469

1 of 4 11 x 8.5 in

A map was created showing the statewide cases of E coli, as well as a report with the name and contact information of local health agencies affected by the outbreak.

Food Vendors:

As part of your investigation, you will look at the food vendors and restaurants in Sedalia that the ill people visited.

Create a detailed map of the state fairgrounds with the food establishments by # of cases. Submit this map as a pdf to the EOC.



eatinglist.xls

	A	B	C	D	E	F	G
1							
2						LOG	ESTABLISHMENT
3		PATIENT #	NAME			NUMBER	NAME
4		1	Lyn	Beckman	Sturgeon	1001	Arby's
5						1009	Dairy Queen
6						2045	Hot Wings N M
7						1036	McDonald's
8		2	Larry	Bennett	Hughesville	2027	Beckmann's Cafe
9					Hughesville	2034	Jonnnny's
10		3	Danny	Bennett	Hughesville	2027	Beckmann's Cafe
11						2044	Ted's Diner
12		4	Gentrie	Bennett	Hughesville	2027	Beckmann's Cafe
13						2044	Ted's Diner
14		5	Megan	Bertz	Shelbina	2046	Filler UP
15		6	Joseph	Bitteral	Green City	2045	Hot Wings N More
16						2045	Hot Wings N More
17						1036	McDonald's
18						1043	Pizza Hut
19						2029	Pork Assn.
20						2047	Snacks R Good
21						2047	Snacks R Good
22		7	Cody	Bitteral	Green City	2045	Hot Wings N More
23						2045	Hot Wings N More
24						1036	McDonald's

eatinglist

Mock data showing eating locations for each patient was provided by investigators.

The local health department provided a shapefile of restaurants and fair vendors. Teams summarized the investigative data and joined it with the restaurant/vendor shapefile.



NUMBER OF CASES OF E. COLI BY ESTABLISHMENT



Map Items

E. coli cases

- 1 - 2
- 3 - 6
- 7 - 11
- 12 - 17
- 18 - 27



Key Map

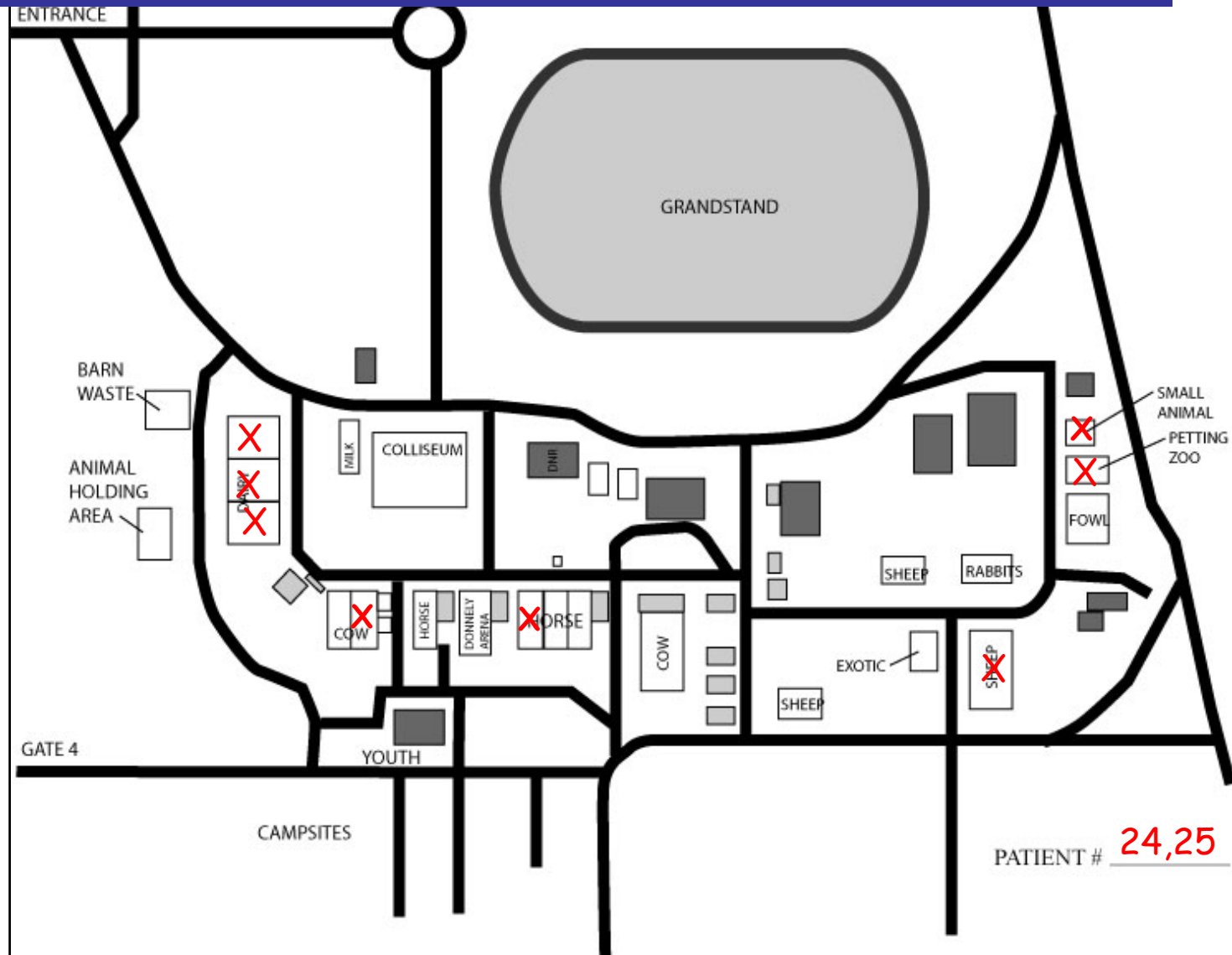
This map is for drilling purposes only.

Livestock Barns:

Now you are assisting with the investigation of the various animal barns on the fairgrounds. The main investigator has provided you with information on which structures were visited by people that have fallen ill. The State Fair office has provided you with a polygon shapefile of the structures on the fairgrounds (sf_structures.shp).

Use GIS to show which structures were visited the most. Create a map of this and submit it to the EOC.

Investigators had each family they interviewed mark which buildings they visited on a map.



Each team had to compile the raw data and join it to a buildings shapefile that was provided by the State Fair office.



State Fair Building Analysis



****This map is for drilling purposes only.****

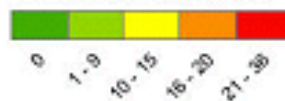


Key Map



Map Items

Number of Patient Visits



Campgrounds:

Investigators are currently interviewing people that are staying in the inner campground. Assist them by creating a gps file of each campsite. Campsite number should be recorded with each point so that the data can be linked to the investigators data. Your team advisor will define the area for you to collect. Submit your data file to the MCC.

Create a map showing the camping area and which campsites found individuals that were not feeling well. Investigators have provided you with a list of campsites reporting feeling ill. Submit your map to the EOC.

Each team went to the inner campground performed data collection.



The campsite location and number was recorded using GPS. collection.



Statefair Inner Campgrounds 6/30/05

Campsite numbers of interviewees
that reported feeling ill:

(Source - interviews of campers and
interviews of confirmed ill)

#314	#30
#120	#167
#308	#310 (c)
#50	#318
#334	#314
#84	#140
#312	#316
#305 (c)	#313 (c)
#310 (c)	

c - confirmed

The investigator's notes (listing which campsites had campers reporting feeling ill) were provided to the teams.



The teams combined the GPS data and investigator's notes to create a map to provide the EOC.

CAMPGROUND ILLNESS

Map Items

- ◆ Campground sites
- ✚ Illness Present



Key Map

Red Team
Task D
6-29-05
2:10 PM

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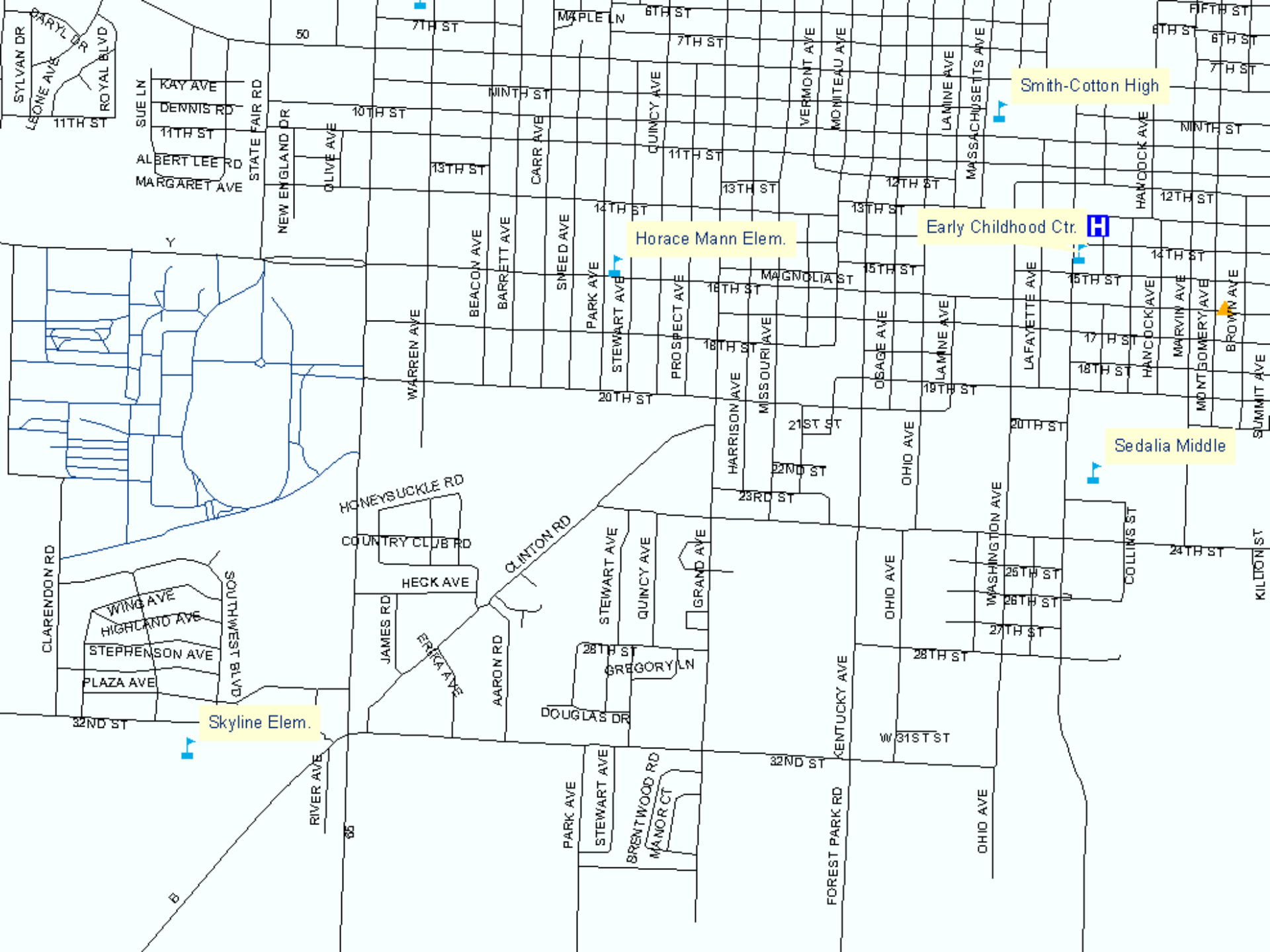
Temporary Clinic:

A temporary clinic is to be set up to take the load off of the hospital. It was decided to use a public school site since they are not currently in session. Using GIS, find the best school for this site. Create a map showing the location of your selected site, the hospital the Pettis County health department, and the state fairgrounds.

Teams used existing data from the GHERM dataset to locate schools near the state fairgrounds.



- KEY ISSUES:
- * POPULATION AT RISK
 - * SUSPECTED PRIMARY CASES
 - * PROJECTED SECONDARY CASES
 - * OTHER AREAS OF EFFECT



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Day 3

Debrief/Discussion



Day 3 began with a review of the day 2 exercise. Each team discussed how they approached each task.



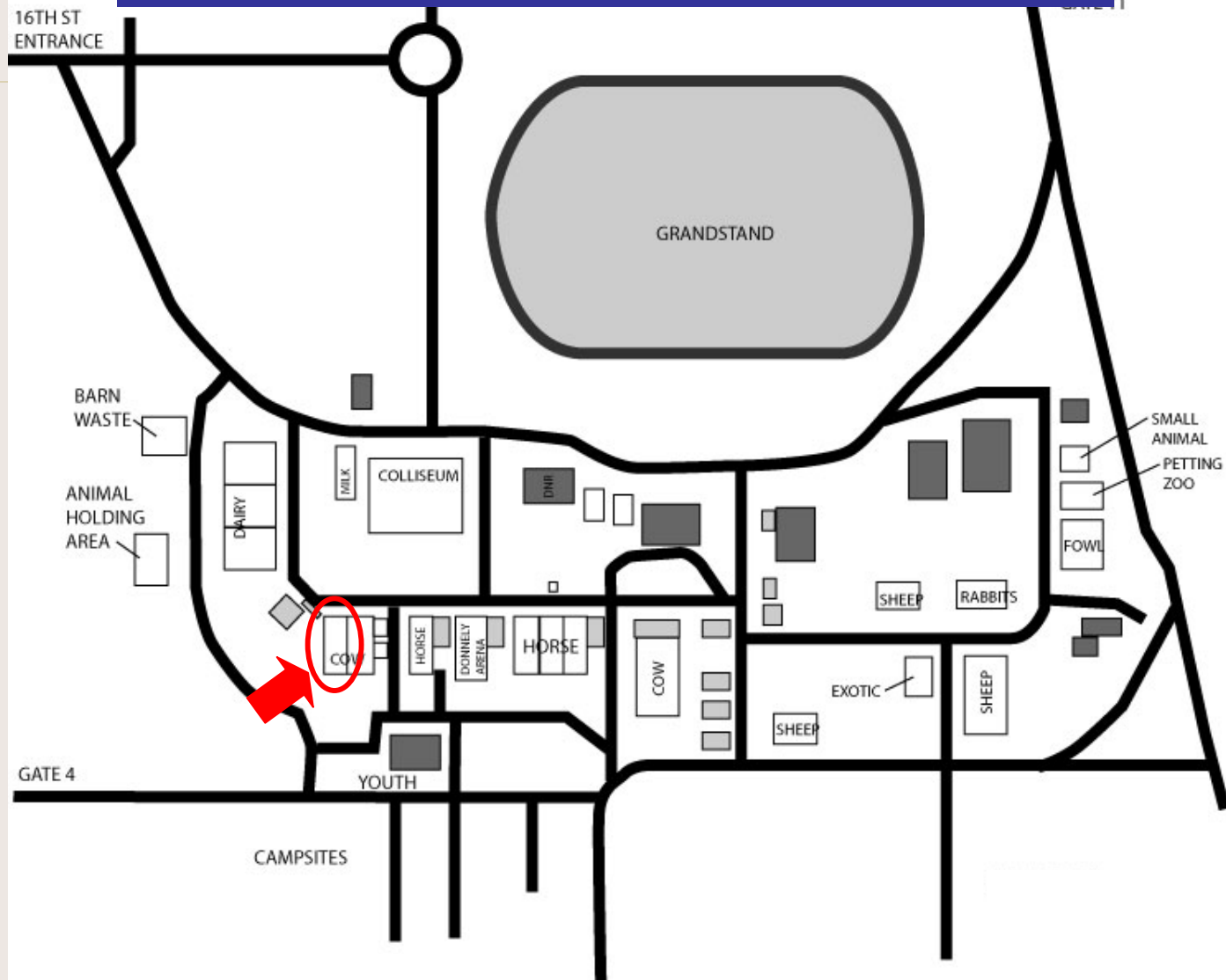
As a final task, building, food vendor, and campground data were brought all together during a group discussion.

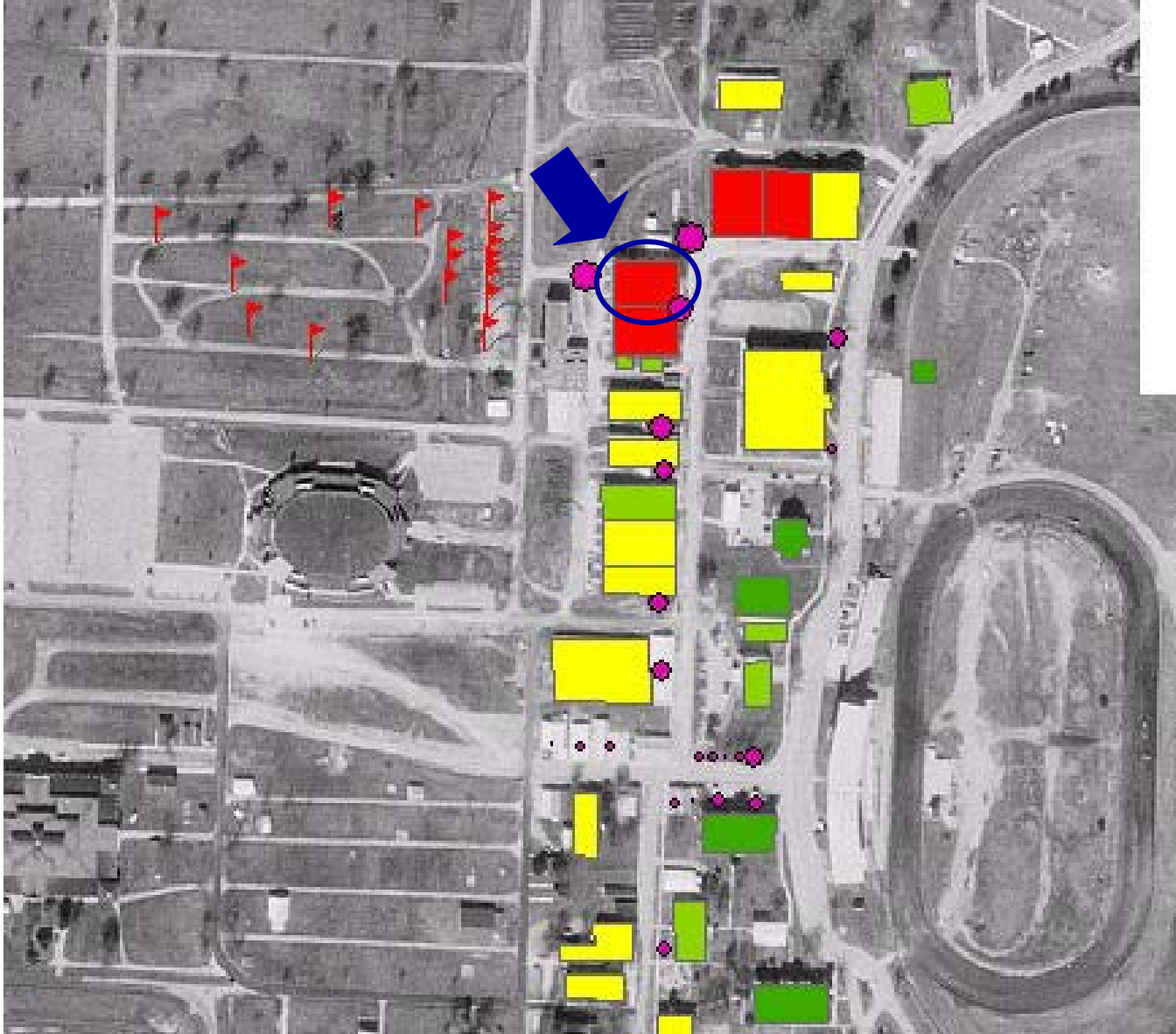
Summary

In completion of the exercise, a summary of events was revealed to the group.

June 30, 2005 – A contaminated livestock building apparently was the source of E. coli 0157 exposure for at least 82 people who got sick after attending the fair.

1





Infected livestock building shown in reference to GIS data collected throughout exercise.

Livestock building used for simulation of E. coli outbreak.



Scenario results, as described to participants:



The building is believed to have become contaminated when an infected cow shed E coli 0157 by defecating on the floor. The pathogen survived and possibly multiplied in the sawdust.

Scenario results, as described to participants:



Widespread contamination of surfaces in the building probably resulted from airborne transmission from sawdust on the floor.

Scenario results, as described to participants:



Fans circulating air in the barn could have spread the pathogen.

Scenario results, as described to participants:



People most likely became infected when they ate or drank after touching tainted surfaces or when airborne bacteria landed on their food or in their mouth.

Scenario results, as described to participants:



Airborne bacteria affected nearby campers, landing on their food or in their mouth.

Scenario was developed from actual events:

Lorain County, Ohio fair 2001

- 23 people ill, most attended a dance in the multi-purpose building
- 14 weeks after the fair, 8 of 16 samples from the building, including some from railings, bleachers, and rafters, still yielded Shiga toxin–producing E coli O157.
- At 42 weeks, the pathogen was still found in sawdust from the floor.

<http://www.cidrap.umn.edu/cidrap/content/fs/food-disease/news/nov2603ecoli.html>

Scenario was developed from actual events:

Lorain County, Ohio fair 2001

- 1st outbreak which data implicates a contaminated building as the source of infection
- Believe that the building first became contaminated when an infected cow or other animal shed E coli O157 by defecating on the floor. The pathogen survived and possibly multiplied in the sawdust, and sawdust may have become airborne during the dance or another large event.

Scenario was developed from actual events:

Lane County Fair, Oregon 2002

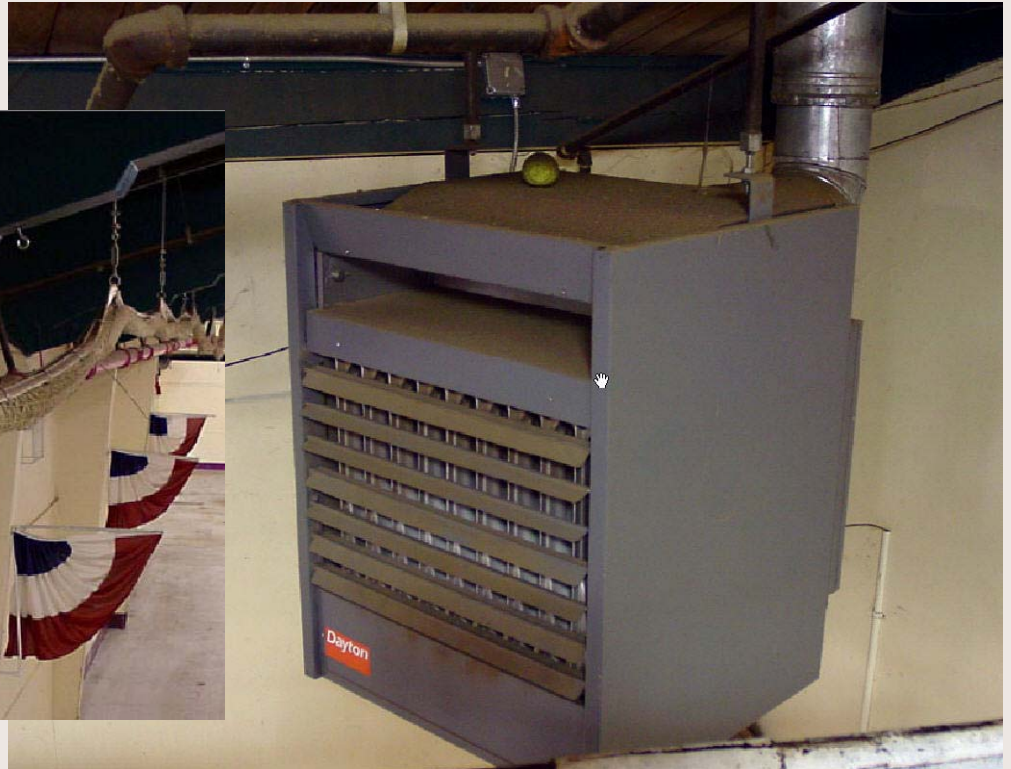
- E. coli 0157 bacteria sickened 82 people. Believed to be airborne inside the goat and sheep expo hall.



Scenario was developed from actual events:

Lane County Fair, Oregon 2002

- All positive samples were 15 feet to 18 feet off the ground.



<http://www.fair-safety.com>

Participant feedback from Field Exercise

- Liked that we used a real life situation, could happen in any county
- Team advisors were very helpful
- Liked that wide range of GIS techniques were used

Participant Feedback from Debrief

- Chance to see various methods that yield similar results
- Interesting to see how other teams approached each task
- Pulled all work together, see tasks our team didn't get to

Overall Feedback

- Create monthly exercises of tasks
- Too hot
- Have more laptops for field
- Hands-on work was great, not just watching
- More comfortable using ArcView now
- Liked warm-up exercises to refresh skills before the big day 2 exercise.

For more information contact:



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